SCIENCE NEWS

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ARTIFICIAL PRODUCTION OF RADIOACTIVITY

ARTIFICIAL radioactivity has been produced for the first time by Professor F. Joliot and Mme. Irene Curie-Joliot, the famous Paris physicists who are husband and wife. Mme. Curie-Joliot is daughter of the discoverers of radium. Never before has radioactivity been created by an external cause.

This achievement has stirred interest at the famous Cavendish Laboratory, Cambridge, where experiments attempting confirmation are in progress. There is hope that through artificial radioactivity medically useful radiation will be produced.

The artificial radioactivity produced by the Joliots consists of obtaining positrons or positive electrons from bombardment of boron with alpha particles. The important fact is that the activity or disintegration produced continues for many minutes after the bombardment is stopped. Boron decays exponentially to thirty per cent. in fifteen minutes. Similarly, artificial radioactivity proceeds in aluminum and magnesium. The decay period in aluminum is four minutes.

Lord Rutherford stated that "It is remarkable that the life of the unstable atom produced is as long as it is. We do not know whether the atoms so far made artificially radioactive are typical or whether other unstable atoms which may be produced will have a longer or shorter life.

"The discovery of the Joliots shows how little we really know about radioactivity."

The mechanism of the artificial radioactivity of boron is interpreted to mean that a boron atom and the helium nucleus or alpha particle unite to form a neutron and an unstable nitrogen atom of weight thirteen which in turn changes to a carbon atom of weight thirteen with the release of a positron. The positron is the new particle discovered in 1932 at Pasadena, California.

M. and Mme. Joliot made experiments that were an important step toward the discovery of the neutron at Cambridge, England, in 1932.

While transmutations and disintegrations of matter have been accomplished in many ways before, the propressive and continuing disintegrations of atoms have not heretofore been accomplished or instigated artificially. Natural radioactivity has been proved, since its discovery before the turn of the century, to be a property of many atoms.

Uranium and radium are typical elements that are naturally radioactive. Some of the unstable atoms naturally radioactive have an extremely long life. The activity of radium only falls to half its value in 1600 years. Other spontaneous changes require time measured in seconds, thus being similar in time period to the artificial radioactivity discovered.

"POISON WATER" OF THE BLACK SEA

CARCASSES of beasts that died a hundred thousand years ago or more still choke the bottom of a large part of the Black Sea, and still poison the water there with the noisome products of their decay. This explanation of the Black Sea's 200,000 square miles of "poison water" was offered by Professor Reginald A. Daly, of Harvard University, who delivered the Silliman lectures at Yale University.

During the last great Ice Age, Professor Daly explained, so much water was locked up in the great glacial sheets that the sea-level was materially reduced. The Black Sea was thus filled with fresh water, and the overflow river of this enormous lake cut the valleys now represented by the Bosphorus and Dardanelles straits. When the general sea-level rose again, the salt Mediterranean water entered the fresh water basin and killed its freshwater animals. The decay of their carcasses poisoned the Black Sea water, from the bottom at the depth of 110 fathoms or 200 meters up to the 90 fathom or 150 meter level.

"Through that great thickness, a half million square kilometers of water remain poisoned to this day. The Glacial lowering of general sea-level laid bare wide belts of the continental shelves, now bounded by the 40 fathom line. Those strips of new land were several hundreds of thousands of miles in total length and up to 100 or more miles in width. Across the temporary lands the rivers were extended and there cut channels in the shelf sediments.

"An illustration is that of the North Sea area, where the floor of that shallow sea emerged. The Dogger Bank became dry, and it remained dry long enough to win covering peat bogs, fragments of which have been dredged up by fishermen from depths of 40 meters. Elsewhere on this new land forests grew. Fishes now swim over the tree trunks, drowned by the last upswing of ocean level. Recently tusks of mammoths have been dredged up from the bottom of the North Sea. Across the temporary land, the Rhine River was lengthened by about 200 miles, and it gained the drainage of the Thames River.

"Another important result of the lowering of the sea-level was the conversion of wide but relatively shallow straits into dry land, with the formation of land bridges between continent and continent, and between continent and island. Thus, for many thousands of years land animals could walk, migrate between Borneo and Sumatra; between Tasmania and Australia; between Ceylon and India; between Asia and America, at Bering Strait; and between many a West Indian island and its neighbor."

THE VELOCITY OF SOUND

SOUND travels 1,087.13 feet per second. This new and highly precise value for the velocity of sound has been computed by Dr. Dayton C. Miller, of the Case School of Applied Science, using data obtained as a result of big gun firing at Sandy Hook just after the close of the World War. Because he has been engaged upon his ether drift experiments, Dr. Miller did not find time to compute his experiments until recently.

The new value, which is for standard conditions, in free air, at the freezing point (0 degrees Centigrade), is near the mean of values of other experiments, the recognized velocity in text-books now being 1,088 feet per second. This means that sound travels a little over a fifth of a mile in a second. The old trick of finding the distance of a lightning flash by counting seconds until thunder is heard, then dividing by five to obtain the distance in miles, is still useful.

An accurately surveyed base of about four miles in length was available to Dr. Miller. The source of sound was the discharge of a large gun at the Sandy Hook Proving Ground. Six listening stations were placed along the course, the first one being about 100 feet from the gun, and the last one four miles away. At each station was a microphone, similar to those used in radio studios. Each microphone was connected by an electric circuit to a recording galvanometer which made a photographic record of the time of the arrival of the sound at the corresponding station. The galvanometer was of the type known as a string galvanometer, which is used in laboratories for various purposes, one such use being the recording of the sounds from the heart beats in medical researches. Meteorological observations for temperature, humidity, barometric pressure, and the velocity and direction of the wind were made at both ends of the course and at two intermediate stations. Seventy-one sets of records were obtained.

THE USE OF BLOOD TESTS IN ANTHROPOLOGY

EXTENSIVE blood tests carried out on Indians of British Columbia by Professor R. Ruggles Gates, of King's College, London, and Dr. G. F. Darby, bring fresh evidence showing close relationship of the American Indians to certain tribes found mainly on islands of the Siberian coast, such as the Giliaks of Sakhalin.

Investigators differentiate four main blood types called A, B, O and AB. The importance of these blood types was made evident during medical operations involving blood transfusion, since serious consequences or even death would result if blood of an individual of type A were transfused into an individual of type B. Type O will mix with either A or B, but A and B if mixed together will cause "clumping" or coagulation. A simple test with a single drop of blood quickly determines the blood-group to which a person belongs.

Practically all pure-blood American Indians of various tribes previously tested were found to belong to the blood-group O. In this they differ from Mongolian peoples on the mainland of Asia and Japan, who have a high proportion of B type.

Haida, Tsimshian, and certain other Indian tribes of British Columbia, have been considered by anthropologists to be more like Mongols in appearance than other American Indians. Professor Gates and Dr. Darby now show that in blood these tribes belong practically all to group O. Out of 300 individuals tested, only two were B and 12.7 per cent. A. And most of the latter were clearly of mixed origin. Thus, the Mongol-like Indians of Canada's northwest are found different in blood type from the mainland Asiatics, but like certain tribes of the Siberian coast and Sakhalin Island.

These findings support the view of Dr. Aleš Hrdlička, of the Smithsonian Institution, who has shown that various racial remnants in northern and eastern Asia and neighboring islands resemble the Indians so strongly as to be often indistinguishable from them in appearance. Such are the Giliaks and Samoyeds.

It would be highly desirable, Professor Gates says, to determine the blood characteristics of all such tribes, before mixed marriages make it impossible to determine exactly their racial origin.

THE RECENT COLD WAVE

THE cold weather carrying "highs" that come from the Arctic have affected particularly the northeastern part of the United States and the weather of the nation has been distorted. As a result the eastern section of the country from Richmond northward has had some of the most frigid weather in its history. It is as though this area had been shifted northward into the Canadian province of Quebec.

The great masses of air with high barometric pressure, known to weather men as "highs," have their origin in the Arctic basin. When this area gets too full of cold air, it flows over much like water from a gigantic bathtub. And like water the highs flow out by the easiest route.

Last year, and usually, the cold has spilled down the narrow valley of the Mackenzie River east of Alaska and southward through Canada along the slope of the Rockies. Montana and Wyoming have felt the blasts of the frigid weather from the Arctic. But this year the frigid "highs" seem to have been unable to find a way out of the Arctic by their usual route and they have pushed on farther eastward and swept southward over the Hudson Bay region to spread record low temperatures over the area around the Great Lakes and in northeastern United States. The Arctic cold air arrived without having spent itself on the northern tier of middle western states and it is colder and fiercer than usual.

As a result of this Hudson Bay trek of the cold air and its avoidance of its last year's route farther west, Montana and Wyoming have had unseasonable heat. In the west it is as though Texas had been transported to the northern limits of the United States. Last year Yellowstone Park registered the all-time low for continental United States cold, minus 66 degrees. This year in Montana and Wyoming there have been days upon days when overcoats were not needed.

The high pressure areas that arrive *via* Hudson Bay vary their paths more than cold waves that enter this country farther to the west. It is more difficult to tell just where they are going to land their frigid burden. New temperature lows were registered in the North Atlantic and Middle Atlantic states as a result of the unusual invasion of Arctic cold. Farther south, well down in Dixie, there was fairly warm weather as usual.

TWO-YEAR PROTECTION AGAINST YELLOW FEVER

MISSIONARIES, government officials and scientists whose work takes them into regions where mosquitoes carrying yellow fever may bite them are now being adequately protected against this toll-taking disease.

For two years investigators working at the Rockefeller Institute for Medical Research under the leadership of Dr. W. A. Sawyer, have applied practically their vaccination technique. Yellow fever virus made safer by at least a hundred passages through white mice is used. Along with the weakened virus human blood from those who have had the disease or have been vaccinated is injected without bad effects. There results an active immunity similar to that which is caused by an actual attack of the disease.

Yellow fever has martyred those who attempted to conquer it. In Africa Drs. Hideyo Noguchi, Adrian Stokes, William Alexander Young and Theodore B. Young died. In Brazil Dr. Paul Lewis died. To-day every Rockefeller scientist in New York, in Africa or in Brazil engaged in the fight is protected by the serum developed by Dr. Sawyer and his associates, Drs. S. F. Kitchen and W. Lloyd.

When in 1931 vaccination against yellow fever was announced to the medical world at a meeting in Philadelphia, it was not known how long the immunity caused by inoculations with immune blood serum would last. Experience has shown it to be exceedingly efficient. Protection lasts at least two years.

Now efforts are being centered upon making the injections less difficult and less costly in human blood. It it not yet practical to protect a whole population against yellow fever, but those most in danger can with safety do their work in dangerous areas.

The Pasteur Institute in Paris has used in its yellow fever vaccinations the blood of immunized horses.

ITEMS

A NEW method of concentrating the double-weight or heavy hydrogen, the essential constituent of heavy-water from which remarkable developments are expected, is reported in *Nature,* by Drs. A. and L. Farkas, expatriate German chemists now working in the Colloidal Laboratory of the University of Cambridge. The new method is chemical and consists in dissolving metals such as zinc in a dilute solution of sulfuric acid. Under proper conditions the lighter or ordinary hydrogen is displaced faster than the double weight variety, in the ratio of four to one, so that the liquid becomes richer in the heavier or double weight variety of hydrogen.

ALL present astronomers or those who will study the far-flung universe during the next 2,000 to 3,000 years will have only light that is already within the Milky Way to aid them. So immense is the universe, Dr. Harlow Shapley, director of Harvard Observatory, explained in a lecture at New York University on "Time," that even light speeding 186,000 miles per second travels only a very short distance, astronomically speaking, in what seem to be long periods of time from the human standpoint. Within the next year Harvard telescopes will make a thousand photographs of external galaxies, so distant that it takes light a million years to travel from them to earth. The photographs will be made by the "flux of energy" or light that is already far this side of our nearest star.

A NEW type of direction-finder, incorporating a cathode-ray oscillograph, has been devised by L. H. Bainbridge Bell, of the Government Radio Research Station at Slough, Buckinghamshire. It shows the bearing, course and approximate distance of all large shipping within a distance of ten miles, provided that the ships are sending out the signals required by the new system. The instrument has a dial marked with the points of the compass. Whenever signals are received bright green arrows appear behind the dial. The direction of each arrow gives the bearing of the corresponding ship and its thickness indicates her distance. If the system is internationally adopted all fogbound ships will send out every twenty seconds a signal consisting of a Morse "dot," the signal itself lasting only a thousandth of a second, so as to reduce interference to the minimum. The signals are received on two fixed loop-aerials, mutually perpendicular, which are connected to electrically similar amplifiers. The outputs from these amplifiers, at the original radio frequency, are applied to the two pairs of deflecting plates in a cathode-ray oscillograph. The screen of the oscillograph forms the indicating dial of the instrument.

GRAND ISLE in Lake Superior, once famous for its white deer herd, again has an albino deer and residents of the vicinity hope the unique herd is coming back. For several years none of the white deer were seen. The one sighted this year has led local residents to believe that the albino strain continued through the herd, to crop out again this season in an all-white offspring, and perhaps to presage another white herd.

SPICES and condiments in moderate amounts really help digestion by stimulating part of the digestive apparatus to greater activity. Scientific evidence of this has been reported by Drs. E. v. Kokas and G. v. Luchàny at the Stefan Tisza Institute of the University at Debrecen, Hungary. The research, it is claimed, shows that spices in dilute solutions, as they are found in rather spicy meals, actually increase the activity of the villi. These are microscopic protuberances of the mucous membrane of part of the digestive tract and have an important influence on the speed and completeness of food absorption. Increasing their activity favors the passage of foodstuffs from the digestive tract into the body fluids.

METEOR showers in Central Europe will in future be observed from airplanes flying high above the mist and clouds which often blot out the sky in November, when the Leonids appear. The Government of Czechoslovakia has agreed to put at the disposal of the Astronomical University of Prague a specially adapted airplane with an unlimited field of view, for this purpose.